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A Poe Memorial.

Leading members of the Lake Carriers' Association have for some time past been quietly considering plans to in some way retain, if possible, the services of Gen. O. M. Poe of the army engineer corps, until such time as the new canal lock at Sault Ste. Marie and other big improvements connected therewith are completed. According to present plans, the canal will not be entirely completed until the spring of 1897, while if department regulations are rigidly adhered to Gen. Poe's retirement will take place sometime in advance of that. The movement to retain the general comes from vessel owners like Capt. E. M. Peck, Capt. James Millen, Mr. William Livingstone, Jr., and other leading Detroit vessel owners, who know him best, but there is little doubt that he will be taken up by vessel men in all parts of the lakes with as much earnestness as has attended the mention of it in Detroit.

It is also the intention to have the Lake Carriers' Association take up the subject of having arrangements made for the erection at Sault Ste. Marie of a memorial of some kind fitting the services of Gen. Poe in connection with the big river and harbor works on the lakes, which have been under his supervision and which are among the most extensive ever undertaken in this country. Of course, action of this kind is not entirely in accord with Gen. Poe's modest disposition in such matters, but there is a general feeling in shipping circles that he is worthy of great honor upon the completion of his labors on the lakes and such honor will undoubtedly be accorded him in the most appropriate manner possible. Suggestions with reference to the matter are now in the hands of Capt. Geo. P. McKay and other Cleveland officials of the association and they will be brought up as soon as an opportunity is offered by a general meeting.

Contracts for Revenue Cutters.

Bids were opened in Washington, Wednesday, for the two revenue cutters authorized by the last congress, and it was found that the Globe Iron Works Co. of Cleveland was the only bidder for the boat to be stationed at Milwaukee. The Globe company offered to build the boat according to specifications for $147,800 and will undoubtedly be given the contract. On plans modifying the machinery design the Cleveland builders submitted a bid of $142,750, but it is thought this will not be entertained. On the second vessel, which is intended for service on the New England coast, and which could not be built on the lakes, on account of difficulty that would attend her passage through the St. Lawrence canals, two bids were submitted by coast firms. The New England coast boat is to be of composite construction and somewhat smaller than the lake steamer. Bids on her were from the Atlantic Iron Works of East Boston, $159,951, and Reeder & Sons of Baltimore, $173,764. The lake steamer to be built by the Globe company was fully described in the REVIEW of May 23. She is to be 205 feet over all, 188 feet water line, 32 feet beam, 16 feet depth of hold and of 900 tons displacement at a mean draft of 10 feet 10 inches. Engines will be triple expansion, having cylinders 25, 37½ and 56½ inches diameter with a common stroke of 30 inches, and there will be four single-ended boilers of the Scotch type. With engines developing 2,000 horse power the steamer is expected to maintain a speed of 16 knots.

Boulders Weighing many Tons—Detroit River Dredging.

Boulders that would make a shipmaster's hair stand on ends are being taken out of the channel between Ballard's reef and the Lime-Kiln cut, Detroit river. Of course many of them were imbedded deep into the gravel and sand on the bottom of the river and are not obstructions to navigation under the deepest draft at present available throughout the lakes, but the work of removing them is made a part of the 20-foot channel project. Capt. McKay of the Lake Carriers' Association spent a few days of last week on the Detroit river making inquiry regarding the channel improvements. Contractors have been at work since last fall in the vicinity of Ballard's reef and the Lime-Kilns removing these boulders under the direction of Assistant United States Engineer Kahlman. For 300 feet east and west of a line centering the Grosse Isle ranges and the Lime-Kiln cut the channel is being carefully gone over with a view to removing all boulders so that dredging later will provide a 20-foot channel, 600 feet wide, from Ballard's reef to the cut. As yet the work has progressed for a distance of little more than half way down to the cut on the west side of the line, but some 700 or 800 boulders have been removed. One of them contained nearly 100 cubic yards. It was raised with two scows and when dropped later in an out of the way place near Grosse Isle there was only 14 feet of water over it, although the depth all around it was 23 feet. These big stones are raised with "devil claws," which are clamped over them, but as there is a long job yet before the contractors, with prospects of many larger boulders to be found, it may be necessary to resort to drilling and the use of dynamite.

In that part of the river between Bois Blanc island and the Bar point light-ship all obstructions are removed, and as a part of the 20-foot channel this stretch is practically completed. This gives a clear channel for a distance of 400 feet east and west of the course followed between Bar point light-ship and the Amherstburg ranges. Pontiac shoal opposite the little school house on Bar point was one of the bad spots removed in dredging this stretch of the river. The character of the bottom here was gravel, boulders and stone that had the appearance of having been quarried at one time. This latter material is thought to have been ballast brought to the mouth of the river thirty years or more ago by small vessels from Ogdensburg and thrown overboard by them before going up the river to load timber and other freight.

Below the Bar point light-ship the firm of L. P. & J. A. Smith is pushing the dredging work rapidly for a distance of 400 feet east of the range line, and they hope to finish this fall, but there is yet a great deal of work to be done on their contract.

Immense Canal Traffic.

Official figures regarding St. Mary's Falls canal traffic for the present month will not be published until next week, but it is now evident that in both the number of boats locked through and in registered tonnage all previous records will be surpassed. As the movement in west-bound freight, especially coal, has been light, the increase in freight tonnage as a whole is not large, but the records being made in the number of vessels and registered tonnage are wonderful. Up to two years ago the 100 mark in the number of vessels had not been reached; now it is a common occurrence, and for the five days ending June 18 the average was 107, and for the month up to and including the same date the average was ninety-six. On May 17 107 boats with a registered tonnage of 100,936 were locked through the canal and it was thought that this record would remain unbroken throughout the season, but it has since been exceeded on three different occasions, as follows: Tuesday, June 11, 109 boats, registered tonnage, 94,054; Saturday, June 15, 112 boats, registered tonnage, 104,345; Monday, June 17, 119 boats, registerad tonnage, 103,870. Unofficial figures dealing with the number of passages and registered tonnage from June 1 to 18 inclusive follow:

	Number of boats.	Registered tonnage.
June 1	105	91,690
2	100	87,545
3	93	92,761
4	95	89,424
5	87	74,273
6	81	75,452
7	102	89,069
8	92	90,055
9	92	97,315
10	94	91,166
11	109	94,054
12	63	69,923
13	85	76,438
14	103	91,820
15	112	104,345
16	95	88,696
17	119	103,870
18	106	94,364

Contracts for two new freight ships for the Vermont Central Railway Company, which were sought by lake ship builders, have gone to the Roach ship yard at Chester, Pa. Dimensions decided upon for the boats were 282 feet keel, 42 feet beam and 19 feet hold, so that it would be impossible to take them complete through the Welland and St. Lawrence river canals. They will be fitted with triple expansion engines and will in all respects be first class freight steamers. They are intended for service between New York and New London. A contract for a freight vessel of about 450 tons register was also closed recently by the Chester concern.

Immensity of Railway Business in the United States.

The Interstate Commerce Commission has just issued, for the immediate use of the press, an abstract of the "Statistics of Railways of the United States," for the year ending June 30, 1894. A few meager facts taken from this document will give a general idea of the immensity of the railway business of this country.

Railway corporations to the number of 1,924 made reports on the date named.

The total amount of reported capital was $10,796,473,813 and the capital stock $4,834,075,659.

On all railways of the country there are 35,492 locomotives and 1,278,078 cars; 9,893 of the locomotives and 33,018 of the cars are in the passenger service.

The total railway mileage in the United States on June 30, 1894, was 178,708.55, an increase during the year of 2,247.48 miles. The increase during the previous year was 4,897.55 miles. The percentage of increase in 1894 was less than for any preceding year for which reports have been made to the commission.

Gross earnings were $1,073,361,797, a decrease as compared with the previous year of $147,390,077, or 12.07 per cent. Net earnings were $341,947,475, a decrease of $50,883,100 as compared with the previous year. Nearly the normal amount of dividends was paid, notwithstanding the great decrease in income, but the payment of dividends entailed a deficit from the operations of the year of $45,912,044.

On the basis of four persons being dependent on each wage earner, full three millions of the population of the United States derive support from the army of workmen directly employed by railways, as the number of employes on June 30, 1894, was 779,608, and this represents a decrease of a little more than 10 per cent. when compared with the same date in 1893. In fact all railway business, excepting passenger traffic, was light during the year ending June 30, 1894, on account of depression in business. Passenger traffic was helped by the world's fair.

The increase in passenger traffic, occasioned by world's fair travel, brought the total number of passengers carried during the year up to 619,688,199, or 26,127,587 more than during the previous year. There was a large decrease in freight traffic, the number of tons carried being 638,186,553, as against 745,119,482 in 1893, a decrease of 106,932,929 tons. The ton mileage was 80,335,104,702, a decrease of 13,253,007,131 from the previous year, and the ton miles per mile of line decreased from 551,232 in 1893 to 457,252 in 1894, a decrease in density of traffic of 93,980 ton miles.

Weight, Fuel and Repairs in Boilers.

Chas. W. Whitney of New York, who represents in this country the Ellis & Eaves induced draft, Serve's ribbed boiler tubes, Purves' boiler furnace flues and other specialties, is well posted on the latest practice in marine engineering, and his acquaintance with ship building matters is of special advantage to the English manufacturers whom he represents. The following paragraphs are contained in a letter from him treating of other business matters:

"I have given a good deal of thought and attention to the matter of water tube boilers for marine purposes, and I am entirely satisfied in my own mind that when they are fairly tried with boilers of the Scotch marine type with suction draft they are certain to lose in the end. The additional space required in the ship by the water tube boiler is an objection to them that can never be overcome, and the additional quantity of fuel re-required to produce the same amount of power will bankrupt any line using water tube boilers in competition with steamers fitted with boilers of the Scotch marine type with induced or suction draft. Repairs on water tube boilers are much greater than any that are required in fire tube boilers with natural or suction draft."

"I read with much interest in the last issue of your paper, June 20th, why Babcock & Wilcox boilers were removed from the steamer Unique, and I have only one word to say more than I have already said in my communications to the REVIEW about water tube boilers for marine purposes, and that is, that the removal of them for just such difficulties as have been experienced in Mr. McElroy's steamer will not be "unique" very long. I do not believe that water tube boilers will be a success in any case where any great amount of power is required. One of the great troubles with water tube boilers, viz., the necessity of having many more experienced men to look after them and keep them in running order, was well expressed by a distinguished Italian engineer at the meeting of engineers and naval architects at the Chicago fair. He said that they had gone into this matter carefully in Italy, and had come to the conclusion that it was easier to drive four large horses than sixteen ponies. It was stated there, I think, that about 500 I. H. P. was as much as could be gotton out of any single water tube boiler at that time known. There is no question in my mind, whatever, that the best and the most economical type of boiler for marine purposes is the Scotch type, and it is assuredly the one that gives the least trouble with natural draft. As induced or suction draft is simply natural draft intensified, there is no trouble with the tube ends or with any other part of the boiler of this type."

A Boat from Oshkosh.

A polar bear at the equator or an ostrich in Alaska would not be much more out of place or attract more attention than a stern-wheel steamboat on Lake Superior. Nevertheless a stern wheeler, better known to lake people as a mud toboggan, drifted into the Sault canal, a few days ago, bound from Oshkosh to Duluth. "Henrietta from Kaukauna" was on her stern, and further back than that was a big "push-her-along" wheel, 14 feet in diameter and 16 feet long. On the sides of the Henrietta, once in big letters, but now paled by a coat of white wash or skim-milk, was the legend "Line Boat Green Bay, Oshkosh, Fond du Lac." Now Oshkosh and Fond du Lac are generally associated with Pickford or Podunk as lake ports. This is all wrong. They are on Lake Winnebago, which is a shallow inland body of water, thirty-five miles long and twelve miles wide. The Henrietta draws 3 feet and has upper works like a bowery tenement house. She is 140 feet long over all and 26 feet beam, and can make ten miles an hour in real water, while in thin mud or on a heavy bed she can go faster than a cow walks. When she was first built sixteen years ago she developed a speed of 15 miles an hour, 'tis said, but her steam allowance has been cut down to 100 pounds. She has had a license for 300 passengers, and once she carried 700 people from Oshkosh to Fond du Lac and back, on an excursion. In fact, the Henrietta was the floating palace of Lake Winnebago and the crack craft of the Fox and Wolf rivers. She was purchased recently, by B. B. Inman of Duluth, and will ply in Duluth and Superior harbors and up the St. Louis river to Fond du Lac, 18 miles from the mouth, where the falls are encountered. Capt. Josh Markee, who once hailed from Bay City, was in charge of the Henrietta. She was a sight to behold in these waters, and hundreds flocked to see her, while the stories of old Mississippi days and races wherein hams were used as fuel came to hand as natural as life. No such craft was ever before locked through the "Soo" canal. The original intention of Capt. Markee was to scoot from harbor to harbor to Duluth, but he now contemplates having his unique craft towed up. Marine men consider the latter to be a dangerous step, as in case of a heavy storm the boat might have to be cast adrift and owing to her light draft she would inevitably be lost.—Sault Ste. Marie News.

In General.

Commodore Francis M. Bunce, a naval officer of sterling qualities, has been selected to succeed Admiral Meade as commander in chief of the North Atlantic squadron.

July 1 is the date fixed for lighting at Fire island the 50,000 candle-power light, which has a lens that will increase its power five times and make the flash visible, it is claimed, 100 miles.

Salaries of officers of the American line steamer St. Louis are as follows: Captain, $5,000 a year; first officer, $1,500; second officer, $1,000; chief engineer, $250 a month; first assistant engineer, $125; second assistant, $100; third assistant, $84. The ship's crew numbers 410, of which 200 are in the engineer's department.

Officers and directors of the International Navigation Company, elected recently in New York, are: President, C. A. Griscom; first vice-president, W. H. Barnes; second vice-president, James A. Wright; secretary, E. A. Parvin; treasurer, J. S. Swartz; directors, C. A. Griscom, H. H. Houston, A. J. Cassatt, William H. Barnes and Francis L. Potts.

A few small lake vessels were registered during the week ending June 15 in the office of the United States commissioner of navigation. They are as follows: Steam—John Owens, Buffalo, N. Y., 129.75 tons gross, 105.90 net, No. 77,186; Silver Spray, Marquette, Mich., 38.89 tons gross, 26.45 net, No. 116,676; Cecelia B., 11.62 tons gross, 7.76 net, No. 127,084. Sail and unrigged—Tycoon, Port Huron, Mich., 287.41 tons gross, 268.38 net, No. 59,462; Miriam, Erie, Pa., 9.01 tons gross, 8.93 net, No. 92,658.

New and extensive fields for blowers and hot blast apparatus are constantly developing. The Buffalo Forge Co., a leading concern in the manufacture of apparatus of this kind, has applied blowers to a number of steam vessels on the lakes, and a business to which its attention is now directed is that of equipping brick manufacturing plants with fans. A number of years ago, it became apparent to this company that around every brick plant a great deal of heat was being wasted. They are now introducing large numbers of steel plate fans of special construction to be used for drying purposes, and which utilize the heat from the burning kilns in so doing. Large fans for this service are being adopted rapidly by the leading brick making works of the country.

GO TO THE SEA SHORE—July 8th to 13th and attend the meeting of the League of American Wheelmen at Asbury Park, N J. The Nickel Plate road has authorized a rate of a fare and a third on the certificate plan.
278 July 4

FOR THE GLORIOUS FOURTH.—The Nickel Plate road offers one fare for the round trip to all points on its line within a radius of 200 miles from starting point. Tickets on sale July 3rd and 4th, good returning until July 5th.
279 July 4

No Relief from Congress in the Matter of Taxes.

Mr. E. T. Chamberlain, United States commissioner of navigation, has been making further inquiry regarding the matter of taxation of vessel property, a subject to which he has given special attention. Mr. Chamberlain is of the opinion that some states, especially on the lakes, impose heavy taxes on shipping, as compared with taxes imposed by foreign nations on their shipping. He finds, however, that any effort by act of congress to relieve this burthen of taxes would probably be futile and that relief should come from state legislatures. The commissioner's latest addition to the fund of information which he has secured on the subject is contained in an opinion from the solicitor of the treasury. With a view to making certain recommendations in his next annual report, Mr. Chamberlain requested an expression of views from the department of justice as to whether an act of congress exempting from state or local taxation all registered American vessels exclusively engaged in the foreign trade would be constitutional or not. The solicitor of the treasury is of the opinion that such an act would be unconstitutional. The full text of the opinion is given herewith, as it shows very careful preparation and contains valuable information on several features of the question of vessel taxes:

Department of Justice,
Office of the Solicitor of the Treasury,
WASHINGTON, D. C., June 18, 1895.

Hon. J. G. Carlisle, Secretary of the Treasury—Sir: The commissioner of navigation requests an expression of my views as to whether an act of congress exempting from state or local taxation all registered American vessels exclusively engaged in the foreign trade, would be constitutional or not. The opinion is desired in relation to contemplated recommendations in the next annual report.

Section 8 of Article 1 of the constitution of the United States provides that the congress shall have power "to regulate commerce with foreign nations, and among the several states, and with the Indian tribes." The power is to regulate or prescribe the rule by which commerce is to be governed. It is not limited to traffic, or the interchange of commodities. It comprehends navigation and intercourse, for commerce is something more than traffic. Judge Story in his commentaries on the constitution, says: "The mind can scarcely conceive a system for regulating commerce between nations, which shall exclude all laws concerning navigation, which shall be silent on the admission of the vessels of one nation into the ports of another; and be confined to prescribing rules for the conduct of individuals in the actual employment of buying and selling, or barter." Sec. 1,061, and Gibbons vs. Ogden, 9 Whea., 189.

The national government has exercised direct power over the subject of commerce and navigation from its commencement. This was one of the primary objects for which the people adopted their government. Judge Story further says: "Foreign and domestic intercourse has been universally understood to be within the reach of the power. How, otherwise, could our system of prohibition and non-intercourse be defended? From what other source has been derived the power of laying embargoes in a time of peace, and without any reference to war or its operations? Yet this power has been universally admitted to be constitutional, even in times of the highest political excitement. And although the laying of an embargo in the form of a perpetual law was contested as unconstitutional, at one period of our political history, it was not because an embargo was not a regulation of commerce, but because a perpetual embargo was an annihilation, and not a regulation of commerce. It may, therefore, be safely affirmed that the terms of the constitution have at all times been understood to include a power over navigation, as well as trade; over intercourse as well as traffic; and that, in the practice of other countries, and especially in our own, there has been no diversity of judgment or opinion." Sec. 1,064.

Section 10 of article 1 of the constitution prescribes that "no state shall without the consent of congress lay any duty on tonnage." * * * There is no express prohibition as to any other tax on vessels engaged in commerce. Since the case of Brown vs. Maryland (12 Whea., 419), it has been repeatedly decided by the supreme court that when a law of a state imposes a tax under such circumstances and with such effects as to constitute it a regulation of commerce, either foreign or interstate, it is void on that account. See Telegraph Co. vs. Texas, 105 U.S.460; Moran vs. New Orleans, 112 Id., 69. In the case of Steamship vs. Port Wardens (6 Wall., 31) the supreme court held that the statute of Louisiana enacting that the masters and port wardens should be entitled to demand in addition to other fees the sum of $5 for every vessel arriving at that port was a regulation of commerce within the meaning of the constitution, and also a duty on tonnage, and was therefore unconstitutional and void. See also state tonnage tax cases, 12 Wall., 204. In Glouchester Ferry Co. vs. Pennsylvania (114 U. S., 196) it was held that freedom of transportation between the states, or between the United States and foreign countries, implies exemption from charges other than such as are imposed by way of compensation for the use of property employed, or for facilities afforded by its use, or as ordinary taxes upon the value of the property. See Pickared vs. Pullman Southern Car Co., and Tennessee vs. same, 117 U. S., 34 and 51; Morgan vs. Louisiana Board of Health, 118 U. S., 455; Cannon vs. New Orleans, 20 Wall., 577.

A tax imposed by a state on vessels engaged in commerce, foreign or domestic, is not necessarily a regulation of commerce. In Moran vs. New Orleans (112 U. S., 69), the supreme court say: "And it is undoubtedly true, as it has often been judicially declared, that vessels engaged in foreign or interstate commerce, and duly enrolled and licensed under the acts of congress, may be taxed by state authority as property, provided the tax be not a tonnage duty, is levied only at the port of registry, and is valued as other property in the state, without unfavorable discrimination on account of its employment." See also Transportation Co. vs. Wheeling, 99 U. S., 273; Morgan vs. Parham, 16 Wall., 471; Hys vs. Pacific Mail Steam Ship Co., 17 How., 596; Wiggins Dry Dock Co. vs. East St. Louis, 107 U. S., 363; Packet Co. vs. St. Louis, 100 U. S., 423.

Cooley in his "Constitutional Limitations" (p. 606) says that duties of tonnage the states are forbidden to lay, but that the meaning of the prohibition seems to be that vessels must not be taxed as vehicles of commerce according to capacity, it being admitted that they may be taxed like other property. In his work on taxation (p. 61) he says that vessels are taxable as property.

In the case of Transportation Co. vs. Wheeling (99 U. S. 273) the supreme court say that beyond question these authorities (cited) show that all subjects over which the sovereign power of the state extends are objects of taxation, the rule being that the sovereignty of the state extends to everything which exists by its own authority or is introduced by its permission, except those means which are employed by congress to carry into execution the powers given by the people to the federal government, whose laws, made in pursuance of the constitution, are supreme. McCulloch vs. Maryland, 4 Whea., 429, Savings Society vs. Coit 6 Wall., 604. The court further says: "Annual taxes upon ships and vessels for the support of state governments as property, upon a valuation as other personal property, are everywhere laid; nor is it believed that it requires much argument to prove that the opposite is unsound and indefeasible in theory, as it is contrary to the generally received opinion, and wholly unsupported in judicial determination. Instead of that, there are many cases in which the courts, in refuting the authority of the states to lay duties of tonnage, have admitted that the owners of ships may be taxed to the extent of their interest in the same, for the value of the property." See Passenger cases 7 How., 283, 479; and Transportation Co. vs. Parkersburg 107 U. S., 691.

I am, therefore of the opinion that an act of congress exempting from state or local taxation all registered American vessels exclusively engaged in the foreign trade, would be unconstitutional and void, except within the limits recognized by the courts. I may conclude in the words of Mr. Justice Clifford in Transportation Co. vs. Wheeling: "By authority (of Gibbon vs. Ogden—opinion of Chief Justice Marshall) it is settled that the power to tax, and the power to regulate and prohibit taxation, are given in the constitution by separate clauses, and that those powers are altogether separate and distinct from the power to regulate commerce; from which it follows, as a necessary consequence, that the enrolment of a ship or vessel does not exempt the owner of the same from taxation for his interest in the ship or vessel as property, upon a valuation of the same as in the case of other personal property."

F. A. REEVE, Solicitor.

The hydrographic office is hurrying the publication of charts of the different lakes, prepared from various sources of information, but as yet only two are in print. One covers Lake Superior and the other Lake Huron and Georgian bay. The next chart of this series to be issued is that which contains Lake Erie and Lake Ontario. It will hardly be possible to get this latter chart out before the end of July, and there is no date fixed as yet for the publication of the chart of Lake Michigan. This information comes direct from the chief of the hydrographic service at Washington. These charts, taking in a whole lake on one sheet, are meeting with great favor among vessel masters, most of whom are purchasing an entire supply of them. In connection with the several books of sailing directions they will make up a complete collection of information for the navigation of the entire chain of lakes. The hydrographic office takes no part in the sale of its publications, but the REVIEW keeps all of them on file and has the agency for the sale of them in Cleveland.

For cylinders and propeller wheels S. F. Hodge & Co., Detroit, are using a mixture called semi-steel, under McDowell's patent, in their foundry, which is very busy at present. A representative of the REVIEW witnessed some hammer tests of this material that would indicate its toughness and its fitness for use in propeller wheels, which are liable to pick up a log or strike an obstructions of any kind. A half dozen wheels on lake steamers are made of this steel, and they are all giving satisfaction.

REDUCED RATES TO ASBURY PARK.—The Nickel Plate road offers a rate of a fare and a third on the certificate plan July 8th to 13th, account national meeting League of American Wheelmen. 277 July 4

Water Tube Boilers for the 400-foot Steamer Zenith City.

In a few weeks the steamer Zenith City, a steel freight carrier 400 feet long, which is being built by the Chicago Ship Building Company for A. B. Wolvin of Duluth, and other well-known vessel owners, will be ready for service in the iron ore, grain and coal trades on the lakes. As the Zenith City is the first freight carrier in this country of large dimensions to be fitted with water tube boilers, and as it is proposed to have the navy department make a test of the boilers in connection with a similar test on a vessel of exactly the same dimensions and same engine power, but fitted with Scotch boilers, a description of the water tube generators will prove interesting. They are manufactured by the Babcock & Wilcox Co., a concern well known in stationary boiler practice, although building marine boilers, principally in Great Britain for the last six years. Engines to which these boilers are to furnish steam at 200 pounds pressure are of the vertical triple expansion type with cylinders 23, 38 and 62 inches diameter and of 40 inches stroke.

The water-tube boilers designed for the Zenith City each contain 3,000 square feet of heating surface and 72 square feet of grate. They are composed entirely of open hearth steel forgings and straight charcoal iron boiler tubes, not a pound of cast or maleable metal or a bent tube entering into their construction. The boiler consists essentially of two banks of tubes placed at an angle of 15 degrees from the horizontal and separated by a combustion chamber, the lower bank being composed of 4-inch tubes placed four rows high, and the upper bank of 2-inch tubes placed eleven rows high. All tubes are expanded at their ends into sinuous wrought steel front and rear headers, forged into shape by hydrauliic pressure. The rear headers are connected at their upper ends by 4-inch tubes to a steam and water drum 42 inches diameter, and at their lower ends to a mud drum or blow-off connection. The front headers are suspended from a cross box supported by two front corner boxes. The cross box is in turn connected to the steam and water drum by 4-inch tubes completing the cycle for circulation, i. e., from the drum down the rear headers towards the mud drum,—where any sediment in the water is deposited—up the inclined tubes to the front headers, up the front headers to the cross box, and from the cross box to the drum. On account of the stagger given to the headers, the tubes are so disposed that the gases are entirely broken up and thoroughly mixed in their passage through the boiler.

Opposite the end of each tube is an opening, through which the tube may be examined and cleaned, or, when necessary, withdrawn and a new tube inserted. The hand-hole plate and inside guard closing this opening are made from rolled plate and forged into shape by hydraulic pressure, the headers being flanged out to form the metal to metal seat under each hand-hole cap. The inside guard is of such shape that should the 1⅛-inch bolt holding the guard and cap in place break, only a leak would result. This same joint has been in constant use in stationary practice for years, and has given excellent satisfaction.

The boiler is encased on the sides with 4-inch tubes expanded into straight manifolds, the furnace sides being formed of square water boxes constructed of open hearth steel half an inch in thickness, doing away with all fire brick in contact with the fire, with the exception of the regulation bridge wall in the rear of the grate. These water box sides insure a cool casing, even when the combustion is forced to the rate of sixty pounds of coal per square foot of grate, and avoids clinkering and repairs. Against the side tubes is placed asbestos and 2 inches of magnesia block covering, the whole being held into place by sheet iron plates braced with angle irons and bolted to the foundations.

Following are some of the reasons urged in favor of the adoption of this boiler:

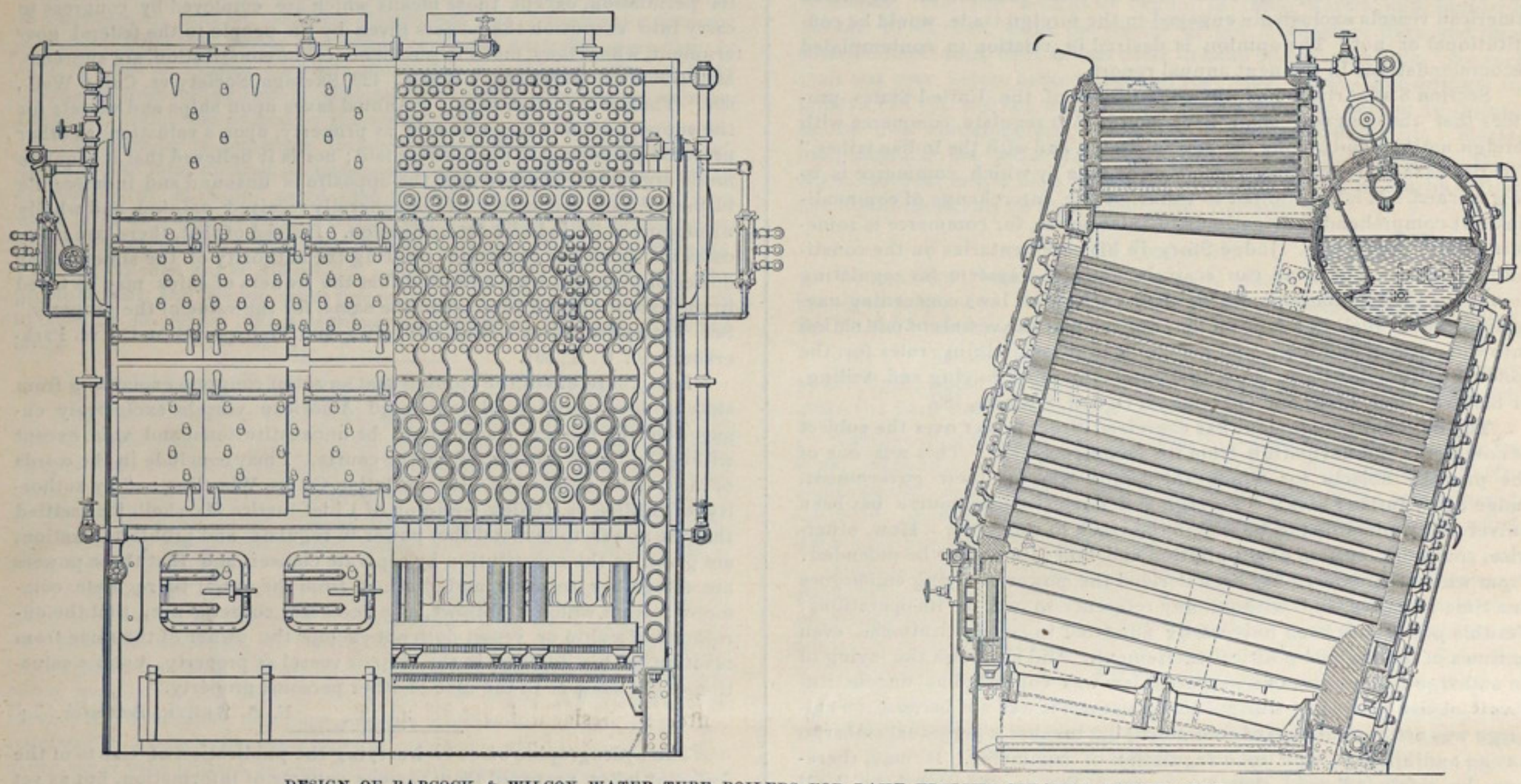
First. Reduction in weight for high steam pressure, the weight being 27 pounds per square foot of heating surface for 250 pounds pressure, against 75 pounds per square foot in Scotch boilers for 175 pounds pressure.

Second. Reduction of space occupied, and increased furnace capacity.

Third. Absolutely free circulation, enabling any amount of forcing that the fireman is capable of.

Fourth. Water sides to furnace, preventing serious radiation, obtaining a cooler fireroom, and avoiding clinkering of furnace sides and repair to brickwork.

Fifth. Absence of automatic devices of all kinds that are continually getting out of order and giving trouble, such as feed regulators, reducing valves, steam separators, etc.



DESIGN OF BABCOCK & WILCOX WATER TUBE BOILERS FOR LAKE FREIGHT STEAMER ZENITH CITY.

Sixth. On account of the body of water carried in the steam and water drum at the water level, and the freedom of circulation, sudden fluctuations in the water level when forcing are eliminated.

Seventh. Steam space sufficient to obtain dry steam without the necessity of expanding from a higher to a lower pressure in order to evaporate the water in the steam.

Eighth. Increased ratio of heating to grate surface, thereby materially improving the economy.

Ninth. Ability to clean, renew or plug a tube through a hand-hole of sufficient size opposite the end of same, without removing any other tube or pressure part, or cooling down the boiler other than blowing off the pressure.

Tenth. All joints are metal to metal, no gaskets of any kind being used. All joints exposed to products of combustion are expanded into bored holes, no screwed fittings being used.

Eleventh. Boilers of large units can be employed, thus doing away with an increased number of small boilers, multiplicity of fittings and additional apparatus.

The manufacturers say that the object is to produce a high-grade boiler in both material and workmanship, that will be easy to handle; that will have every square inch of surface both inside and out accessible for cleaning and repairs when necessary; that will develop as much horse power per square foot of grate as any boiler built and be free from all appurtenances other than those required by law.

Lake Freight Matters.

The iron ore movement is still upholding all departments of the lake trade. Shipments are very heavy, however, and a blockade of vessels at Ohio ports during the past week has resulted in delays that have all along been expected, on account of scarcity of dock space and insufficient supplies of cars. Still, all vessels thus far offered for ore are readily accepted at 85 cents from the head of Lake Superior, 75 cents from Marquette and 55 cents from Escanaba. There is no indication of any immediate reduction in these rates, and although there is practically no grain and the coal supply does not increase as rapidly as was expected, the feeling among vessel owners is still strong. Vessel owners realize, however, that the ore business is now being crowded to its limit, and there is little probability of higher rates during the coming month without a marked increase in the coal movement or some shipments of grain.

Announcement from J. W. Westcott.

Editor MARINE REVIEW: I desire to call the attention of masters and attaches of our lake commerce passing Detroit to the fact that I am still in the business of marine reporting and that I expect to remain in the same business for years to come. My reporters will board your vessels as heretofore, continuing to deliver letters and despatches to and from your vessels, whenever sent in my care. Messages delivered to reporter while you are passing, either day or night, will also receive the attention that has characterized this service for the last twenty years and over. I most respectfully ask that you be on the look-out for my reporter's boat when passing this point.

Detroit, Mich., June 26, 1895. J. W. WESTCOTT.

Draft of Vessels Trading to Tonawanda.

Editor MARINE REVIEW: There has been considerable discussion along the lakes concerning the depth of water to which vessels can safely load for Niagara river points as far as Tonawanda. We think you might confer a valuable favor upon many vessel men by an authoritative statement on this subject. Vessels are coming here right along, loaded with iron ore, drawing 13 feet to 13 feet 3 inches. While we have heard it claimed that lumber vessels have loaded deeper than this, we have no positive knowledge of their having done so.

TONAWANDA IRON & STEEL CO.,
WM. A. ROGERS, President.

Around Lakes.

Abram Smith & Son of Algonac, Mich., launched, on Wednesday, the new steamer building at their yard.

Capt. Wm. Mack of Cleveland, who has about recovered from his dangerous illness, has gone to Sagertown, one of the watering resorts, to recuperate.

About July 5 the color of the skeleton iron tower at Whitefish point, Lake Superior, will be changed from brown to white, to render it more prominent as a day mark.

A. F. Bartlett & Co. of Saginaw, builders of machinery, began suit in Sandusky, a few days ago, against Carkin, Stickney & Cram, dredging contractors, on a claim of $29,300. Dredging machinery owned by the defendants was attached.

The Mitchell steamer George F. Williams, built by F. W. Wheeler & Co. of West Bay City, is now unloading a cargo of 3,231 gross tons of ore, taken on at Ashland. This is certainly a very large cargo to be carried on 14 feet of water, which is about the present Sault canal draft.

Bids for the construction of a first-class composite light-vessel, to be known in the light-house institution as No. 66, will be received at the office of the light-house board, Washington, D. C., until Thursday, July 11. The advertisement calling for proposals appears on page 11 of this issue.

The first of the Conneaut–Port Dover car ferries will be ready for launching at Craig's yard, Toledo, about July 25. Machinery and boilers are being put in and the boat will be so nearly completed when launched that she will go into the service in a very short time. Work on the second ferry is being hurried, and the engines are almost ready to leave the works of S. F. Hodge & Co., Detroit.

In the burning of the schooner J. E. Potts at Delray, near Detroit, a few days ago, another remnant of old-time sailing vessels is removed. She was in service three times as a sailing vessel and twice as a steamer. The Potts with the George W. Bissell, another old schooner, had been given up as useless. The Bissell did not take fire but the loss would not have been great if she had burned also.

About nine hours after wrecking operations were begun on the steel steam yacht Say When, Capt. Todd, which was sunk within the Cleveland breakwater enclosure, the boat was again afloat and on her way to the Ship Owners' dry dock for repairs to her damaged bottom. She was sunk on Tuesday evening and on Saturday was again in commission, taking to Lorain a party of about thirty newspaper representatives, who were in attendance at a convention in Cleveland.

A small steel steam vessel being built at Bell's Engine Works, Buffalo, for service in connection with the Lehigh Valley Railroad at Fair Haven, Lake Ontario, will be launched next week. She is to be named Katherine T. Wilbur, and is 70 feet long and 17 feet beam. The engine is a fore-and-aft compound, with cylinders 12 and 25 inches diameter by 20 inches stroke. The boiler is of the return flue marine type, 6 feet 10 inches in diameter by 11 feet 6 inches long, allowed 130 pounds pressure.

Hereafter vessels passing through the St. Clair canal will be permitted to move at a speed of eight miles an hour instead of five as in the past. To prevent blockades in the canal or its approaches the custodian is authorized to detain any vessel at either end until, in his opinion, a safe passage can be secured. All boats are prohibited from attempting to pass through the canal in the face of running ice without the express permission of the custodian. They can not hug the banks in passing, or deviate more from the middle of the canal than is necessary for safe navigation. This provision is intended to protect the sides of the canal from contact with the sides of boats.

A Model Fueling Scow.

A most important innovation in the construction of big river scows for the safety of steel steamers was shown in the scow Trilby, which was launched in Chicago a few days ago. The Trilby was built for the O. S. Richardson Fueling Co., and instead of having the old style iron shod corners, has neatly rounded ends. The scow is 106 feet long, 28 feet beam and 7 feet 8 inches deep. The sides are planked with 4-inch oak planks, and the deck and bottom are of 3-inch pine. All frames are steel and there are two steel girders, a hollow steel truss and two steel arches running the entire length, making her an extremely strong craft. There are seven athwartship bulkheads. The boat will carry about 600 tons on deck. This is the first scow ever constructed in Chicago with molded ends. She will be used in carrying steamer fuel to the boats as they lie at the docks. The rounded corners are the result of the efforts of Capt. J. S. Dunham, who has long believed that the sharp corners of river scows were a menace to the larger vessels.

"I have been expecting for years," Capt. Dunham said, "that some big steel steamer with a valuable cargo would be sunk in the river by running into the sharp steel pointed corners of a scow. I firmly believe that the government ought not to allow any such engine of destruction moving around valuable vessels as the old-fashioned scow. I hope the Trilby will be the first of many of the new build."

Executive officers of the International Deep Waterways Association, which was formed in Toronto a year ago, met in Chicago during the past week and decided to hold a convention in Cleveland, beginning Sept. 24 and continuing during the 25th and 26th. Through the efforts of this organization a bill was passed in the last congress providing for the appointment of an international commission to investigate and report upon the subject of a deep-water connection between the lakes and the Atlantic seaboard. President Cleveland has not as yet appointed members of the commission for the United States, but it was announced at the Chicago meeting that he will do so shortly and that there is reasonable assurance of the Canadian government acting in the matter immediately after the president makes his appointments. If this is done the Cleveland convention will have a basis to work upon. Governors of states and commercial bodies in all cities on the lakes, as well as cities of the northwest, will be invited to send representatives to the Cleveland convention. Frank A. Flower of Superior, Wis., is secretary of the association's executive committee.

No matter whether there is any truth in the story or not, Capt. "Tommy" Jones of the steamer Iroquois will be forced to make many explanations on the score of having mistaken a gas well for Ashtabula light. The mate was on watch when the Iroquois went ashore while trying to find a harbor in the vicinity of the gas flame, but this will not count with the wags. Capt. Geo. P. McKay is charged with a similar offense during his sailing days, and not long ago Capt. Ed. Morton, now commodore of the Wilson fleet, put the steamer Cumberland on the beach in about the same locality and under like circumstances. Capt. Morton's mate called him for permission to go ahead on the supposition that they were opposite the flash light at Ashtabula, when in fact they were making for a party of country girls and boys assembled at a dance around a big kerosene lamp. They went far enough up into the woods to permit the merry-makers to hail them with jokes about Christopher Columbus while they jumped and clapped hands around the ship's bow.

FOURTH OF JULY EXCURSIONS.—On July 3rd and 4th the Nickel Plate road will sell round trip tickets between points on its line within a radius of 200 miles from starting point for a single fare. Good returning to and including July 5th. 280 July 4

MARINE REVIEW

DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 516 Perry-Payne building, Cleveland, O

SUBSCRIPTION—$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

The books of the United States treasury department contain the names of 3,341 vessels, of 1,227,400.72 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons and over that amount on the lakes on June 30, 1894, was 359 and their aggregate gross tonnage 634,467.84; the number of vessels of this class owned in all other parts of the country on the same date was 316 and their tonnage 642,642.50, so that half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1894, was as follows:

Class.	Number.	Gross Tonnage.
Steam vessels	1,731	843,239.65
Sailing vessels	1,139	302,985.31
Canal boats	386	41,961.25
Barges	85	39,214.51
Total	3,341	1,227,400.72

The gross registered tonnage of vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

	Number.	Net Tonnage.
Year ending June 30, 1890	218	108,515.00
" " " 1891	204	111,856.45
" " " 1892	169	45,168.98
" " " 1893	175	99,271.24
" " " 1894	106	41,984.61
Total	872	406,976.28

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.

(From Official Reports of Canal Officers.)

	St. Mary's Falls Canal.			SuezCanal.		
	1894.	1893.	1892.	1894.	1893.	1892.
No. vessel pass'ges	14,491	12,008	12,580	3,352	3,341	3,559
T'n'ge, net registd	13,110,366	9,849,754	10,647,203	8,039,106	7,659,068	7,712,028
Days of Navigat'n	234	219	223	365	365	365

Entered at Cleveland Post Office as Second-class Mail Matter.

PRESIDENT LIVINGSTONE of the Lake Carriers' Association is a prominent citizen of Detroit and enjoys the advantage of an acquaintance and friendship with the leading politicians and statesmen of Michigan. Gen. Alger, who wields a big influence in Washington, has twice succeeded in overcoming the efforts of the vessel interests to regulate the log rafting business of the lakes. In the last congress he managed, through a shrewd move in the senate committee on commerce, to overthrow, at the eleventh hour, the strongest effort that the association had ever made on the raft towing question. He succeeded in killing a measure that had the endorsement of army engineers who were fully acquainted with lake commerce and the log towing business; a measure that had been carefully prepared in the house committee on rivers and harbors, and which was passed almost unanimously in the house. Gen. Alger's personal interest with certain senators did all this. He is a dangerous adversary on this question, but he will be met by the vessel owners in the next congress with a full knowledge of his influence. The question must come up in the next congress, as the "hogs" in the raft towing business who try to tow millions of feet of logs in a single raft to the detriment of all other floating property, have resumed the practice this season. Mr. Livingstone may be able to treat with Gen. Alger and other representatives of the lumber interests of Michigan for an amicable settlement of this question before congress assembles, but if not there should be no hesitancy on the part of the Lake Carriers' Association in again demanding that congress prescribe such restrictions as will properly regulate the rafting business on the lakes.

THE JULY number of Cassier's Magazine is a very large and important engineering publication. It is devoted to the development of power at Niagara. The number comprises 224 pages of text, with over 200 illustrations, making a magazine nearly three times the size of the usual issue. Although many fragmentary articles regarding the big Niagara project have been published, very few people have more than a general idea of the magnitude of the plan, the ultimate aim of which is to obtain some 450,000 horse power, to be distributed electrically hundreds of miles away. Nearly all of the articles in this special number of the New York magazine were written by engineers who have been, or are now, connected with the work, and the collection of information thus obtained is undoubtedly the most complete and reliable ever published regarding the whole scheme.

UP TO DATE, the efforts of the Lake Carriers' Association to overcome, through its representatives in Buffalo, the abuses that prevailed in the steamboat fuel business, seem to be crowned with complete success, notwithstanding an effort now and then from a shipper to crowd his fuel onto a boat when he makes a charter. This was tried on by two shippers as late as Monday of the present week. It is therefore evident that shippers have not entirely given up all hope of restoring the former method, which was profitable to them but expensive and troublesome to the vessel owner, and it is equally evident that the vessel owners, or their representatives, must exercise constant vigilance. Shippers claimed that they were generous in the matter of freight on coal when they furnished fuel in connection with cargoes, and that this season they would make the vessel men carry coal at reduced rates. The logic of events is against their argument, however, as the freight rate on coal to Chicago and Milwaukee is now, and has been for some time past, 5 cents higher than it was a year ago.

SOME VESSEL owners are of the opinion that soft coal shippers will be forced to pay high rates of freight before the present season is at an end, on account of the great number of vessels that are still running light in the ore trade. However this may be, it is now quite certain that there will be no surplus stocks of coal in the northwest next spring. It will be impossible to move any great surplus in the coal supply this season. Car dumping machines of different types that were projected for all Ohio ports have not been worked out in design, and none of the new ones will be available for service this season. These machines would have caused a big increase in facilities for handling coal, but none of them will be completed in time to be of assistance to the shippers.

IT WOULD NOT be surprising to find lake ship builders in possession of contracts before Dec. 1 next involving new freight steamers of full 75,000 gross tons capacity, and nearly all of them are certain to be of the 400-foot class. Especially will this be the case if dollar ore is a feature of this season's business. Lake vessel owners seem to follow a lead in dimensions of freight ships just as they do in making contracts for carrying coal and ore. The idea of a lake steamer 400 feet long may be credited to H. G. Dalton of the firm of Pickands. Mather & Co., Cleveland. It is understood from a reliable source that he was voted down on a proposition to make the steamer Kearsarge of that length.

THERE IS NO denying the fact that the pretense of inquiry by the steamboat inspection service into accidents involving loss of life on steam vessels is a farce. The idea of any branch of the government passing upon its own negligence in the enforcement of law, much of which is of its own creation, is absurd anyhow. The great number of accidents on the lakes this season involving loss of life, with responsibility placed nowhere, should result in an effort to have some department of the government give to this matter the attention that humanity demands.

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store at the principal points of accumulation on the lakes on June 22, 1895:

	Wheat, bushels.	Corn, bushels.
Chicago	17,460,000	5,255,000
Duluth	8,907,000	.....
Milwaukee	315,000	.....
Detroit	313,000	125,000
Toledo	321,000	261,000
Buffalo	1,195,000	898,000
Total	28,511,000	6,539,000

Among presents made to the American line steamer St. Louis by the city of St. Louis, Mo., were two libraries for first and second cabins, containing 2,261 volumes, specially selected and carefully bound; 200 copies each of hymnals and prayer books; two albums containing a great number of elegant views of the city of St. Louis; ten ornamental glass windows for the first cabin library room, and a full set of flags, including the American ensign and the house flag in silk, and a burgee bearing the name St. Louis.

The new torpedo boat Ericsson is said to have attained a speed averaging 25 miles an hour during a run on Long Island sound a few days ago. Propellers were working at 325 revolutions. Maximum propeller speed for the boat is 480 revolutions.

For the National Educational Association at Denver, Col., July 5th to 12th, the Nickel Plate road offers special low rates. A superb passenger service. Unexcelled dining cars. For information inquire of agents of the Nickel Plate road. 282 July 4

Illustrated Patent Record.

SELECTED ABSTRACTS OF SPECIFICATIONS OF A MARINE NATURE—FROM LATEST PATENT OFFICE REPORTS.

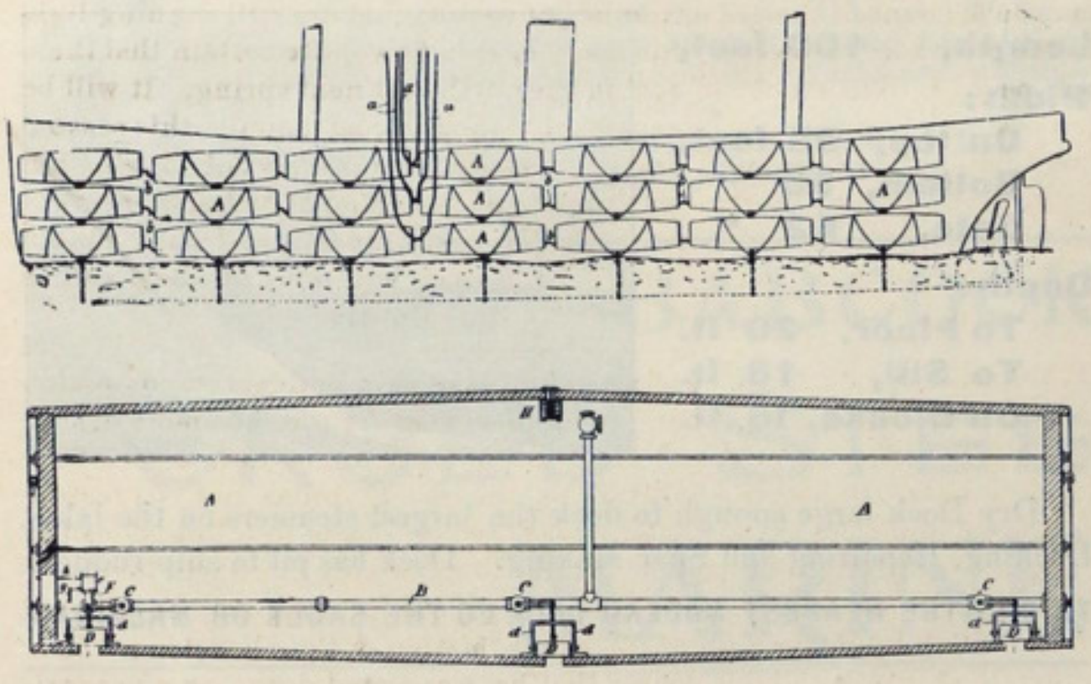
541,174. Apparatus for Raising Sunken Vessels. Albert G. Midford, New York, N. Y. Filed June 13, 1894. Serial No. 514,383.

Claim. In a caisson for raising sunken vessels the combination of a main air pipe leading to the caisson, a normally closed valve in such pipe, a closed case, a piston head in such case attached to the stem of such valve, a pipe from a point in the main air pipe outside the valve connected with such case on one side of the piston head, and a pipe from the outside of the caisson connecting with such case on the other side of the piston head.

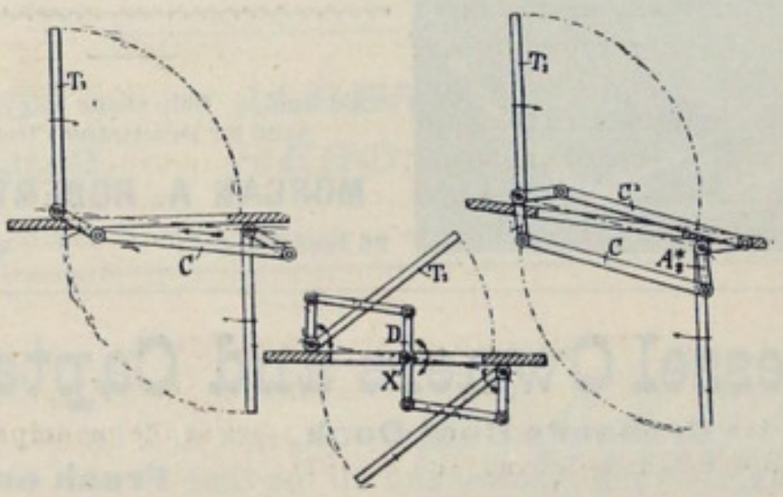
541,253. Double Door for Ships' Bulkheads. Martin Stuhler, Cologne, Germany, assignor to Carl Theodor Dorr, same place. Filed Apr. 5, 1895. Serial No. 544,560.

Claim. A double door for ships' bulkheads consising in the combination of two single doors respectively situated on the two sides of the bulkhead wall and pivoted at opposite edges of the door opening, and

541,174. APPARATUS FOR RAISING SUNKEN VESSELS



541,253 DOUBLE DOOR FOR SHIPS' BULKHEADS



means for connecting the said doors together in parallel relation with each other whereby both open and close simultaneously.

541,286. Apparatus for Steering Vessels. William R. Moore and William Megarvey, Cleveland, Ohio. Filed Feb. 23, 1895. Serial No. 539,378.

Claim. In an apparatus for announcing the course to be steered by a towed vessel, the combination of an electric generating medium, a commutator mounted at the prow, a rotatable post in the commutator, a wire between the commutator and the generating medium, a series of wires leading from the conductors of the commutator to one side of the indicators, a wire from the opposite side of the generating medium, branch wires therefrom to the other side of the respective indicators a contact arm on the rotatable post of the commutator, a lever to turn the post and contact arm, and a tow line attached to the vessel, and a loose mechanical connection between the tow line and lever whereby the lever is made to assume the direction of the tow line.

541,313. Buoy for Locating Wrecks and attaching Lines thereto. Fread Canney, Detroit, Mich. Filed July 2, 1894. Serial No. 516,253.

Claim. In combination with a vessel a lifting strap secured to the hull, and terminating at its upper end with an eye, a double cord engaging through the eye at its bend, a buoy provided with a reeling spool and to float upward, means for detachably securing the buoy to the hull of the vessel in position to release itself therefrom and float to the surface, both strands of said doubled cord being wound on said reel substantially as specified.

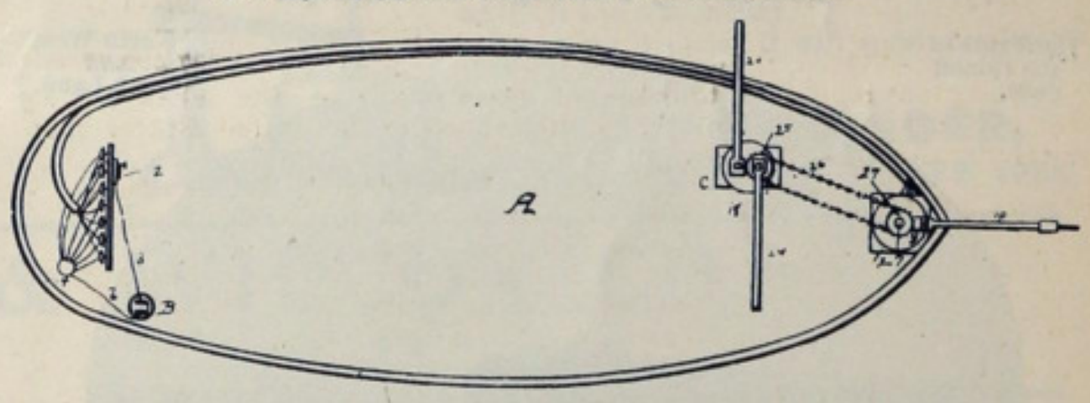
Trade Notes.

The Niles Tool Works, Hamilton, O., has furnished for the new machine shop of Hodge & Co., Detroit, among other tools, an 8-foot planer. Work on this machine, as well as all other tools in the shop is handled rapidly and easily by a 25-ton Morgan crane.

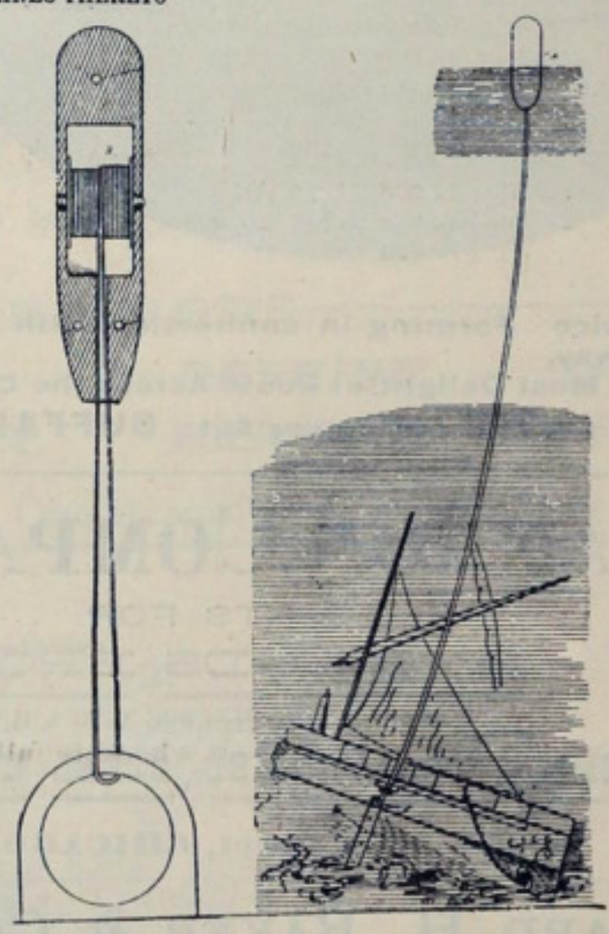
The attention of captains trading at Toledo is called to the advertisement of the M. I. Wilcox Cordage Supply Co. This firm carries a full line of supplies and everything is delivered by the steam yacht Minnie D., which is kept in service for the accommodation of patrons. H. E. Rouse is the manager.

On page 13 of this issue will be found an advertisement of a bilge syphon that is certainly worth investigating. It insures dry bilges at low cost. It is practical and in a slightly different form is in use in thousands of cellars, doing good work. The apparatus is automatic and therefore a great advantage over the ordinary steam syphon.

541,286. APPARATUS FOR STEERING VESSELS



541,313. BUOY FOR LOCATING WRECKS AND ATTACHING LINES THERETO



The Buckeye Steam Fitting Company is a candidate for marine steam fitting business and the sale of engineers' supplies. H. E. Stevens and J. T. Mead of this company are well known by marine engineers, and Lewis Presley is the other member of the concern. They have fitted up a store at 117 River street, Cleveland, and their telephone number is 4058.

Thos. Drein & Son, Wilmington, Del., are furnishing life boats for the Victory and Zenith City, building at Chicago, the new Mackinac island passenger steamer, a steamer at Ogdensburg, a tug built at Benton Harbor and for two barges at West Superior. In addition to these orders, this firm is fitting a dozen or more steamers on the coast with life boats, life rafts, etc.

OFFICE OF LIGHT-HOUSE BOARD, Washington, D. C., June 25, 1895. Sealed proposals will be received at this office until 2 o'clock p. m. on Thursday the 11th day of July, 1895, for furnishing the materials and labor of all kinds necessary for the construction and delivery of one first-class composite light-vessel, No. 66, for a fixed sum for said vessel delivered. Forms of proposal, plans and specifications showing what is required, can be had or seen by applying to this office. The right is reserved to reject any or all bids and to waive any defects. JOHN G. WALKER, Rear-Admiral, U. S. N., Chairman. June 27

Don't You Believe It?

If you don't, give us a chance to prove that we can coal your boats with quick dispatch, and with most satisfactory fuel.

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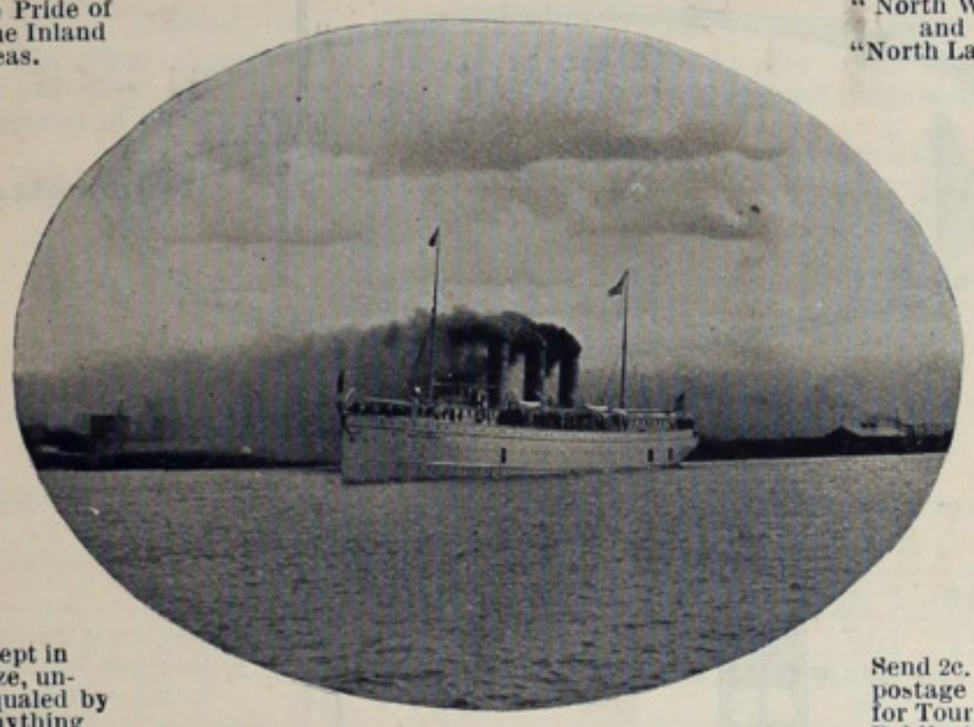

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DUNFORD & ALVERSON,

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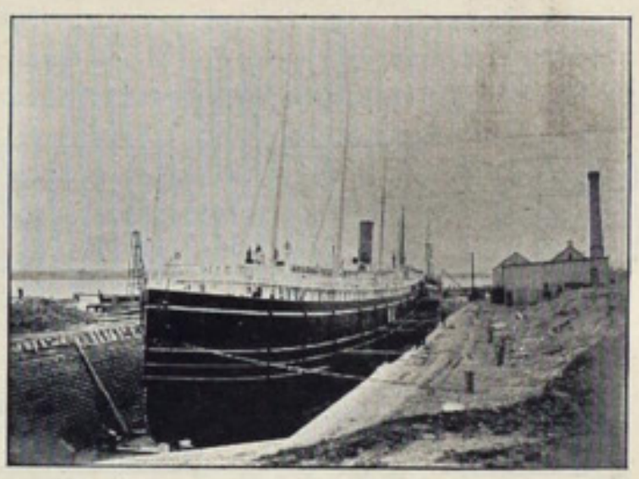
Length, 400 feet,

Width:

On top, 95 feet,
Bottom, 55 "
Gate, 62 "

Depth:

To Floor, 20 ft.
To Sill, 18 ft.
On Blocks, 16 ft.



Dry Dock large enough to dock the largest steamers on the lakes. Docking, Repairing and Spar Making. Dock has pit to ship rudders.

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NAUTICAL WATCH CHAIN.

Solid Gold. Ship-shape in every detail. Send for Descriptive Circular.

MORGAN A. ROBERTSON,

26 John Street, NEW YORK.

To Vessel Owners and Captains

Look out for **Graham's Coal Dock,** *foot of 21st St., Detroit.*

1,000 Tons, *best quality, on hand all the time* **Fresh on Cars.**

You can get it from **Chutes, High Platform or Dock.**

Chutes fit highest or lowest boats, and can give as quick dispatch as at any dock. Widest point on the river, and nothing to interfere in rounding to with tows.

No Car Boats, Ferry Boats or Elevators in the way.

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All kinds of Chain—
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Cable Chains.
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350 STYLES AND SIZES.
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Ship Chandlery and Engineers Supplies, Cordage, Oakum, Wire Rope, Anchors, Chain, FLAGS AND SIGNALS, Hose, Packing, Oils, Waste, etc., etc.

Estimates furnished for complete outfits for vessels.

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89 Fulton St., Boston, Mass. MANUFACTURERS OF

Torches and Liquids for Lights of Various Colors,

For Signal Lights and Illuminations of all kinds.
Blue Flash Lights a Specialy.

We call the attention of masters of vessels to the efficiency of our patented flare-up or flash light torch. It can be used with kerosene or spirits of turpentine. Its superiority over all other kinds of torches is that it is indestructible. Being filled with asbestos, it will last for years, and is ready for use at any moment. It gives a white flame three to five feet high, burns less liquid than any ordinary torch of the same size or larger. The combustion is so perfect that very little smoke is made, and the flame is therefore much brighter. At night you can wigwag with this torch. Rain or spray will not extinguish it, and the stronger the wind the better it burns. We have also a **Blue, Green and Red Burning Liquid,** to make any code of signals required. Yachtsmen will find this of immense value for signaling.

Lake Agents: { The Upson-Walton Co., Cleveland, O.
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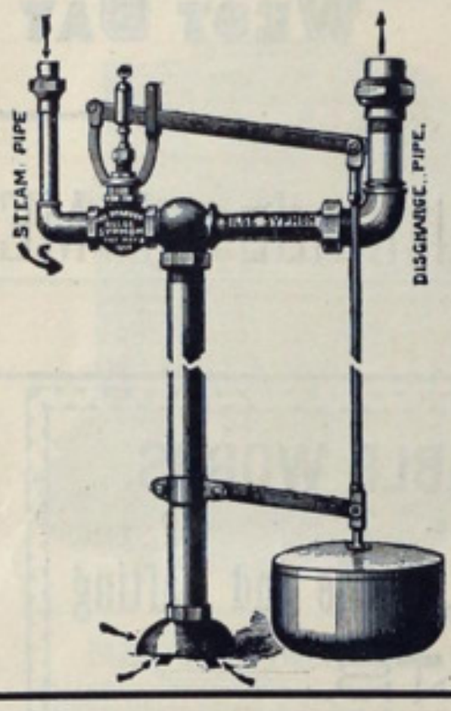

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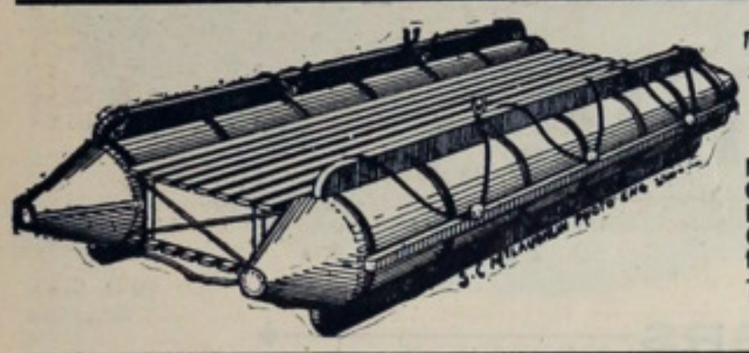

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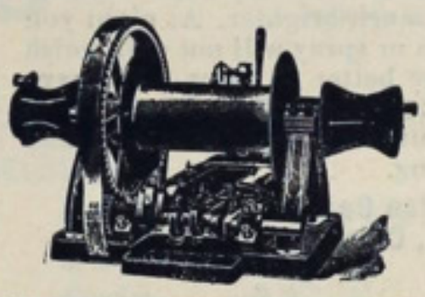

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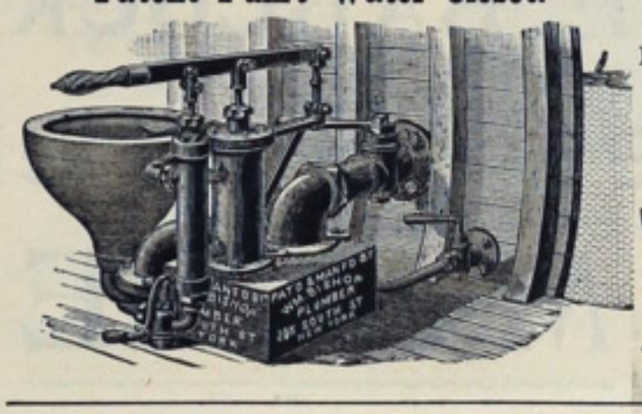

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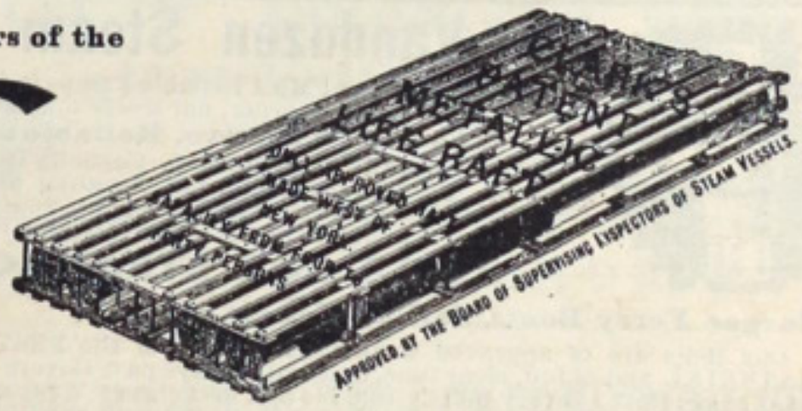

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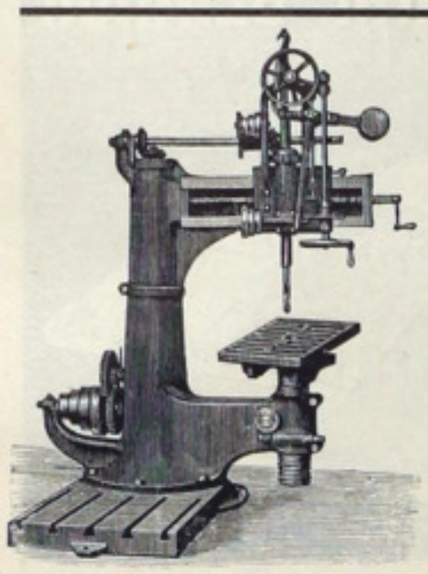

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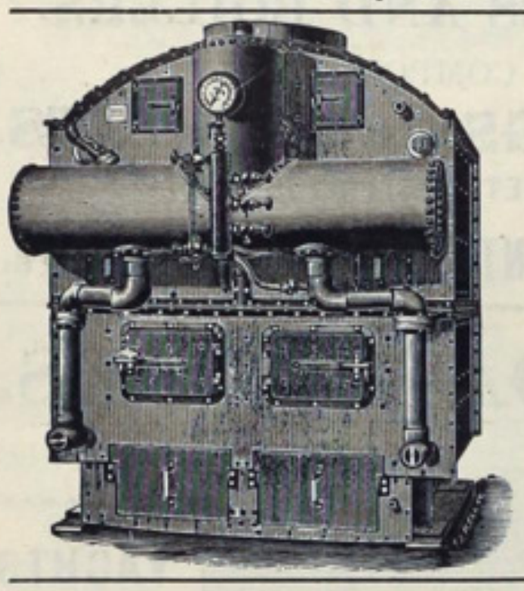

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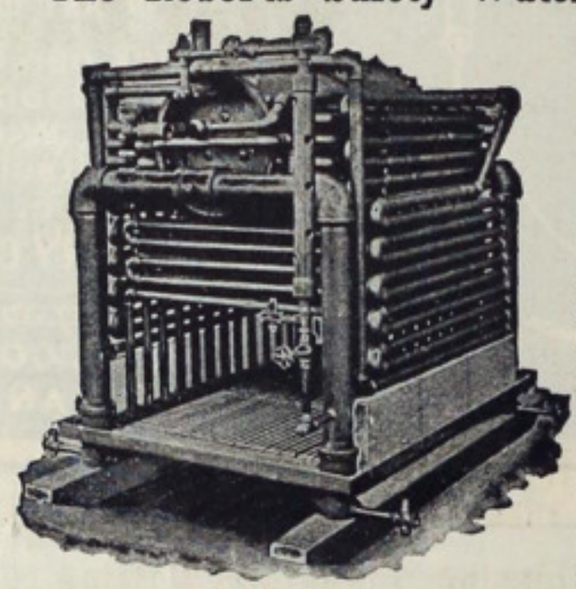

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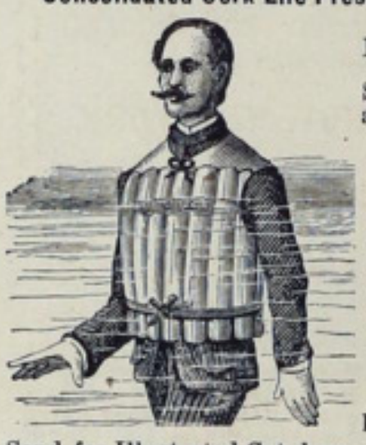

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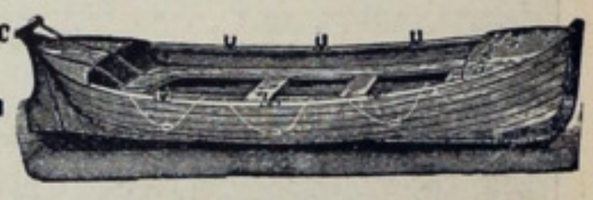

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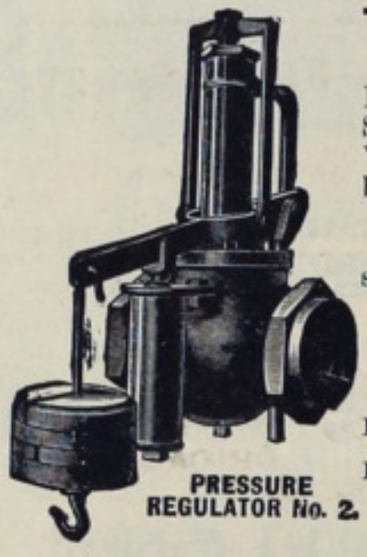

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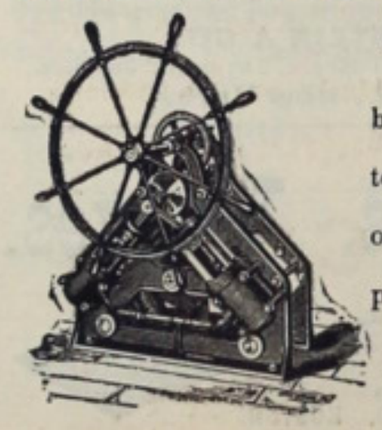

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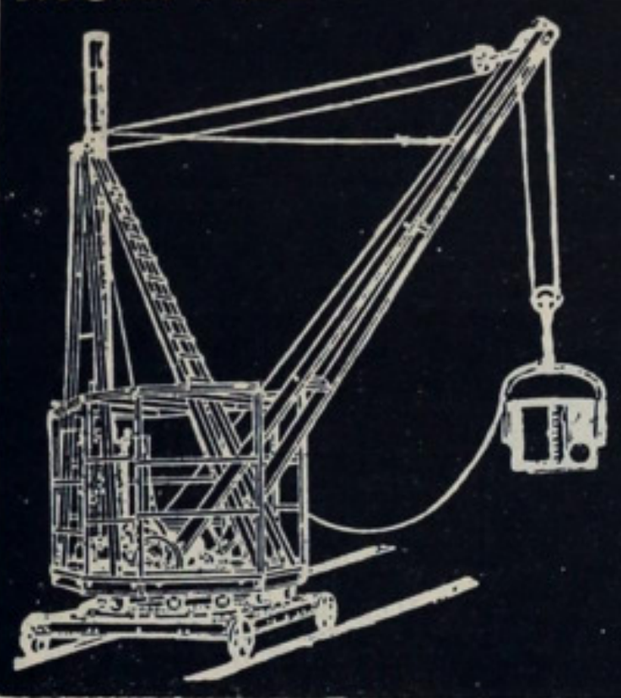

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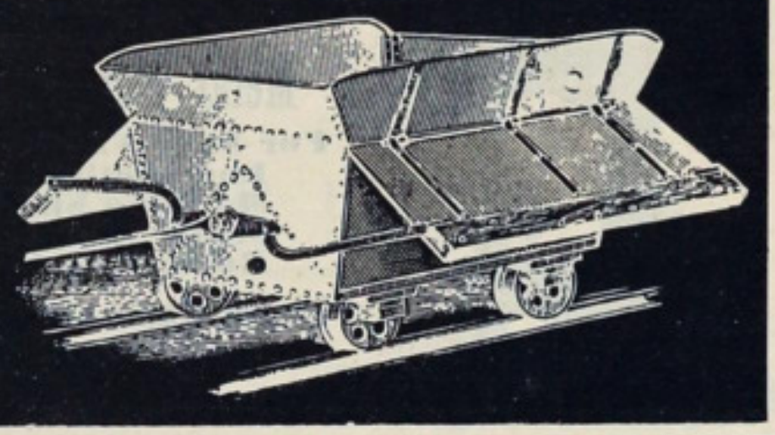

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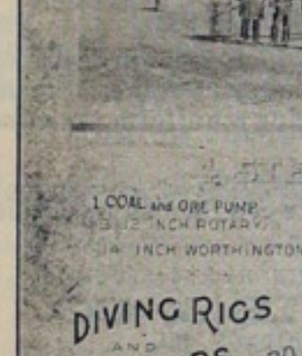

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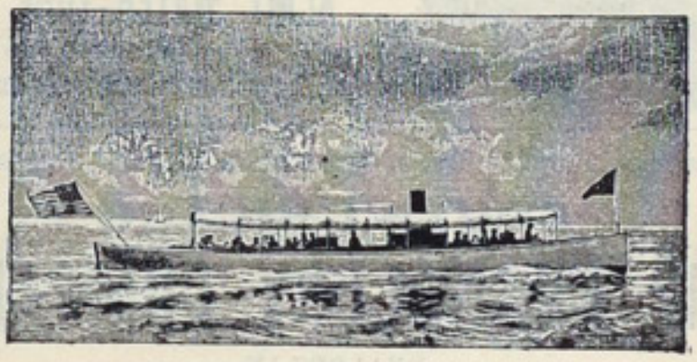

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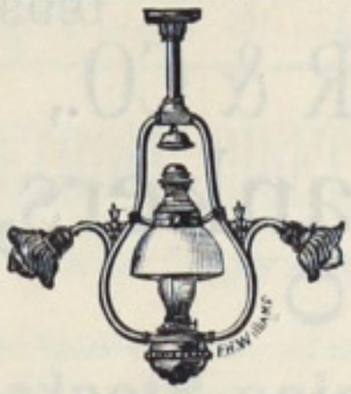

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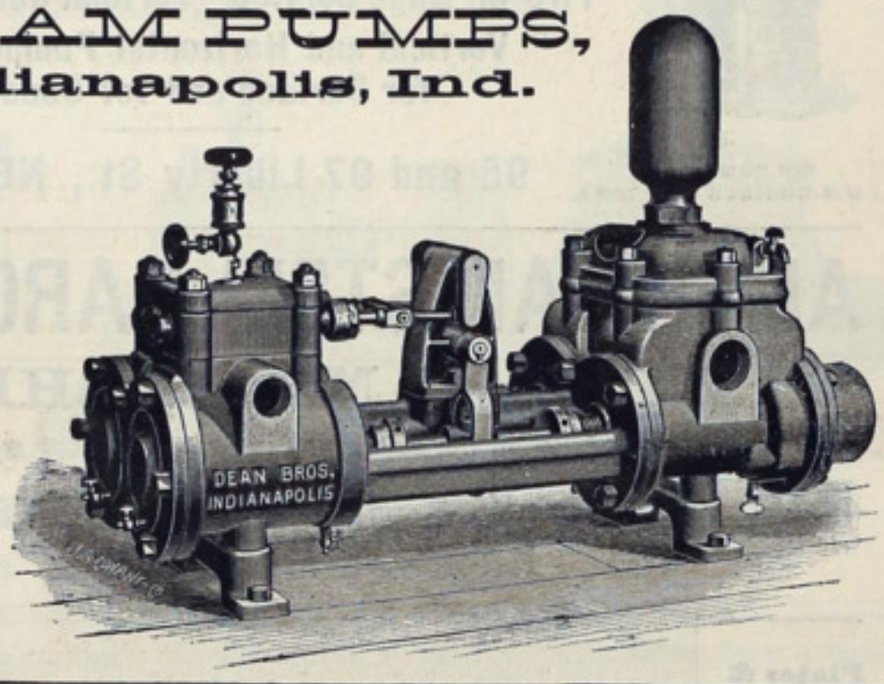

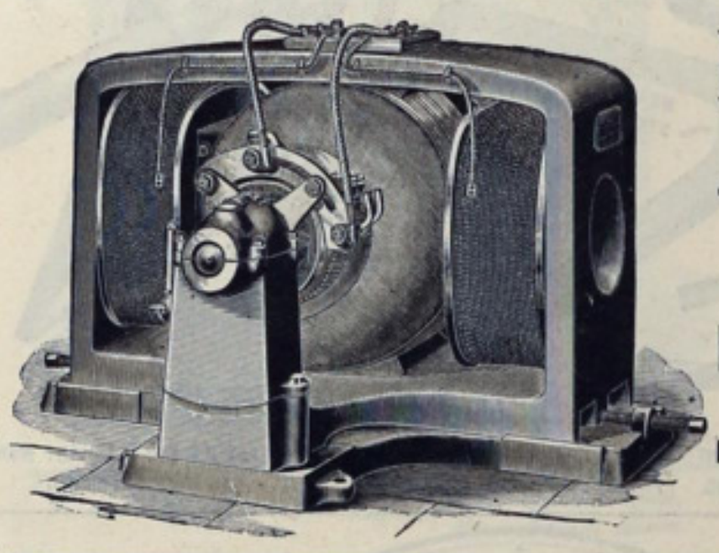

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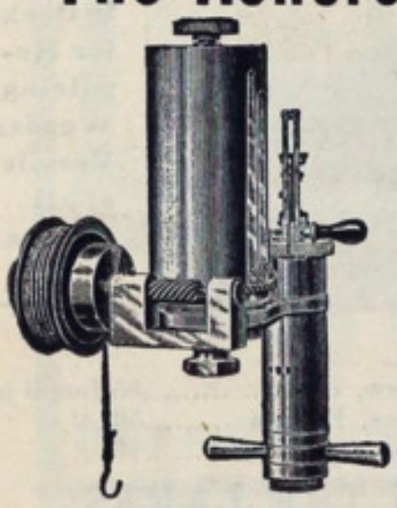

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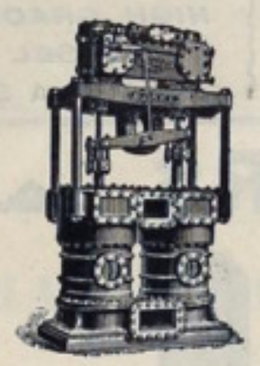

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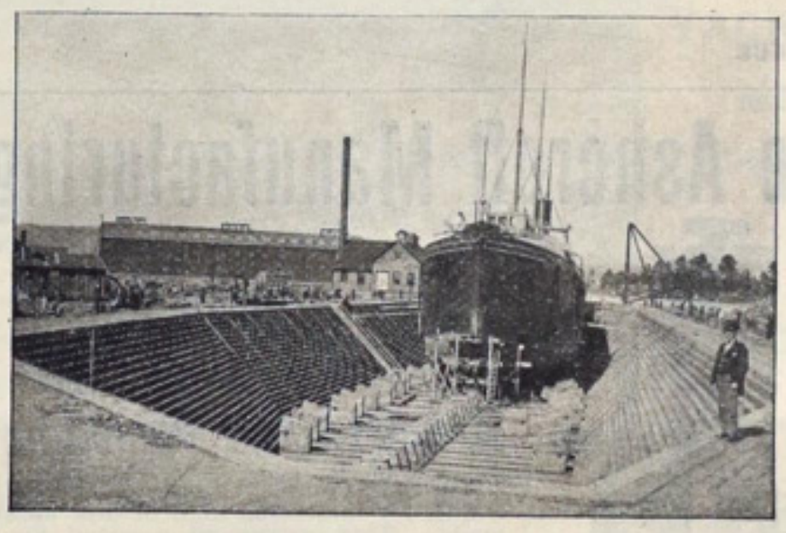

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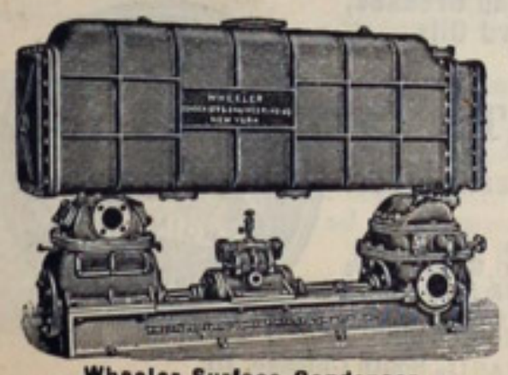

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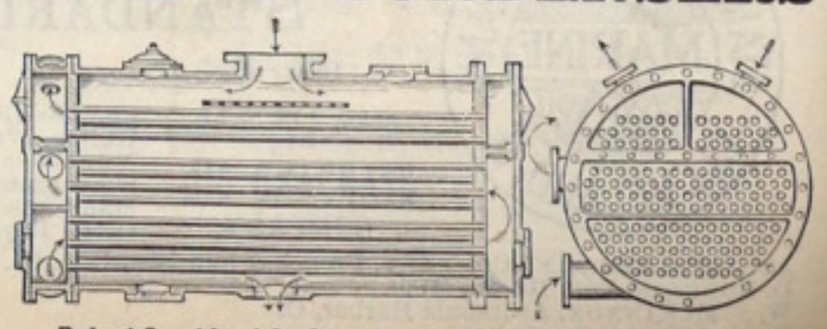

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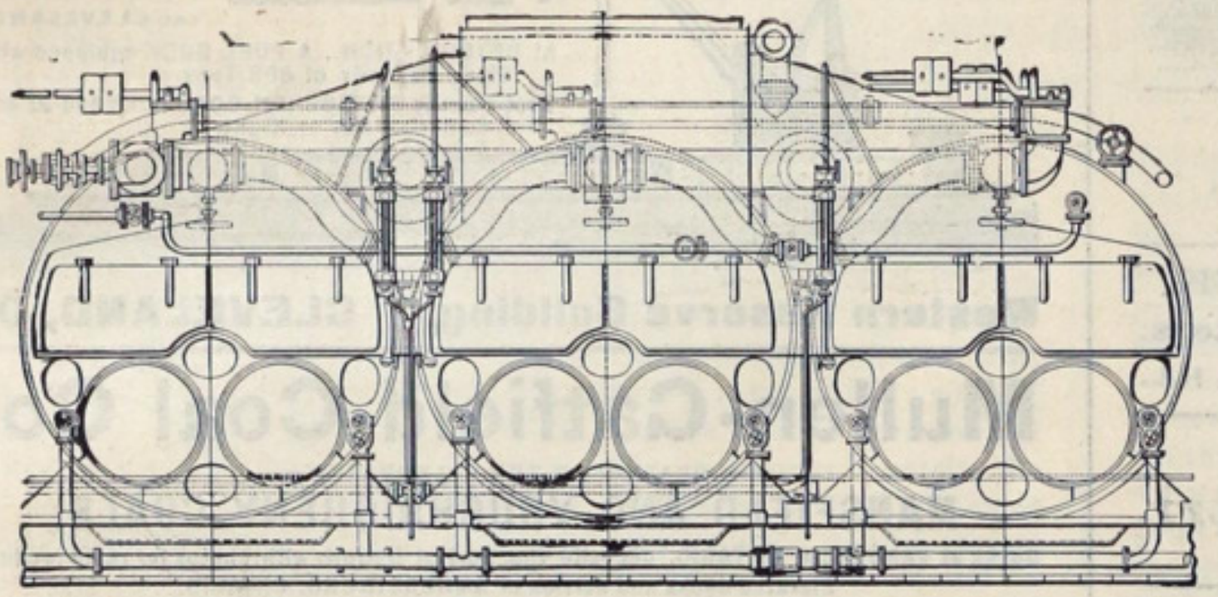

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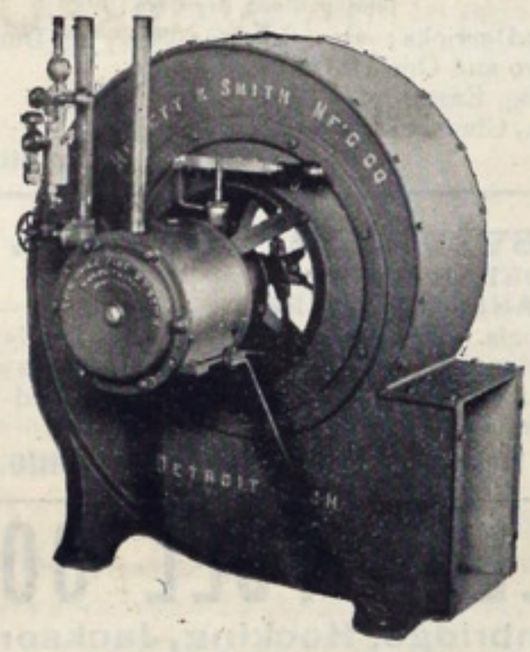

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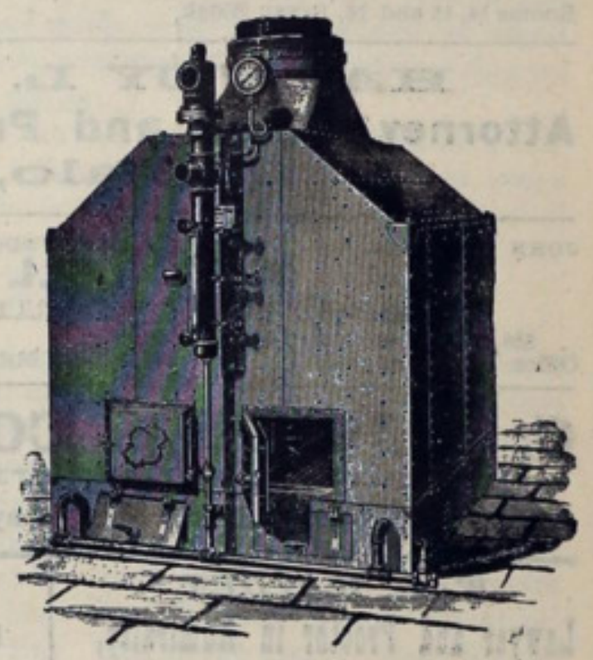

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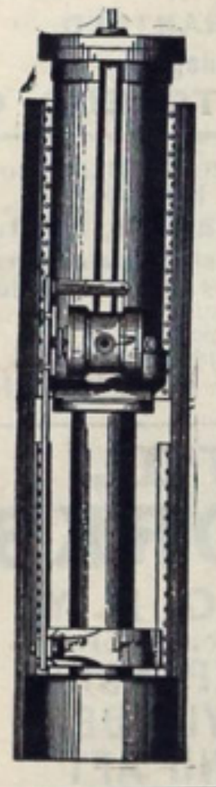

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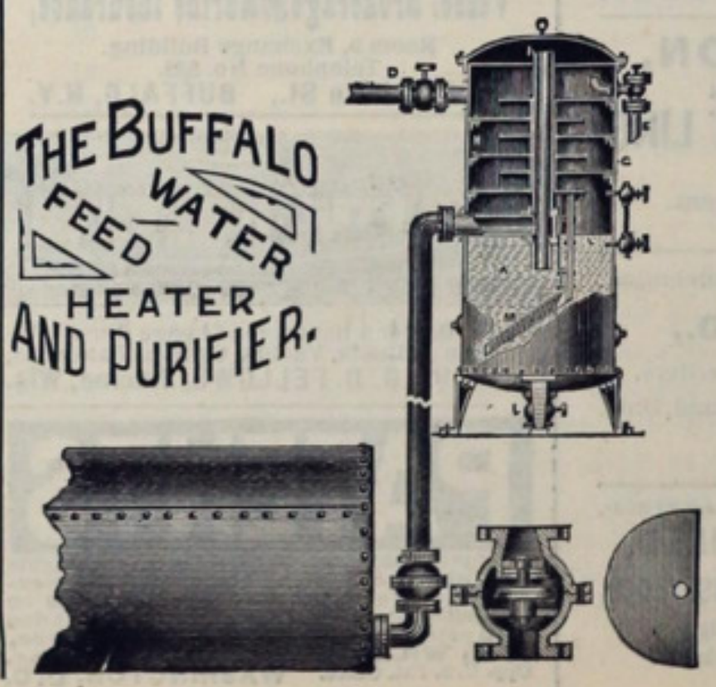

REFERENCES.

A.—Settling chamber.
B.—Boiler.
C.—Feed pipe to boiler.
D.—Steam pipe.
E.—Water supply pipe.
F.—Check valve.
G.—Spray disks.
H.—Spray chamber.
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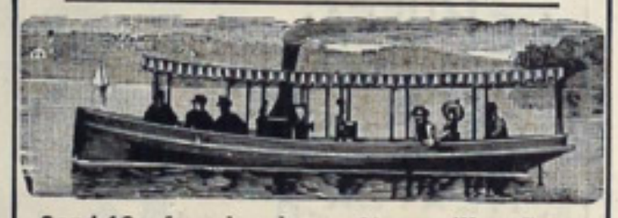

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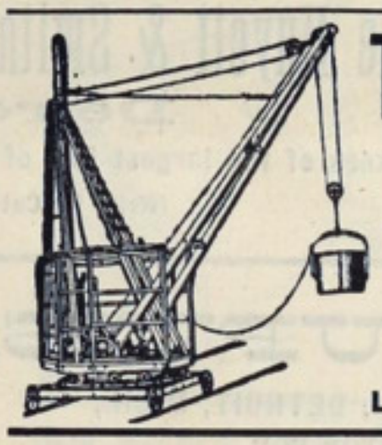

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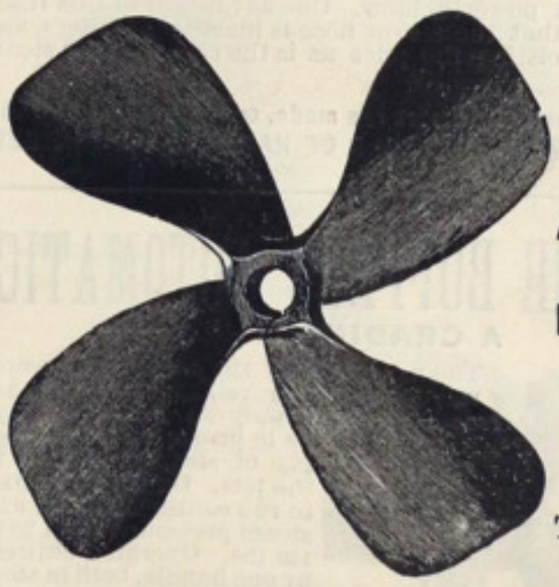

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